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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,569	07/25/2003	Kenji Ishii	2003_1014A	9552

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EXAMINER	
BERMAN, SUSAN W	

ART UNIT	PAPER NUMBER
1731	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/626,569	ISHII ET AL.	
	Examiner	Art Unit	
	Susan W Berman	1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-9 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 01/04
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Information Disclosure Statement

References DE 311 17514 and NL 8 902 092 have been considered only to the extent cited in the European search report.

Claim Objections

Claims 5 and 6 are objected to because of the following informalities: . In claim 5, it is suggested that the word "or" be inserted between structural formulas (5) and (6) in order to clarify that –(Y-O)- is equal to (5) or (6). In claim 6, it is suggested that an equal sign should appear between –(O-X-O)- and structural formula (7). Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 is rendered indefinite because the parentheses around the definitions of "R" groups in formula (3) and in formula (4) make it unclear whether the definitions are part of the claimed subject matter or not.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amagai et al (6,794,481) in combination with WO 03/020781.

Amagai et al discloses a bifunctional phenylene ether oligomer and its derivatives, wherein the oligomer comprises structural units corresponding to structural units (2) and (4) in the instantly claimed vinyl compound. A thermosetting resin comprising cyanate, epoxy or allyl end groups of formula (4) is taught (column 5). An epoxy acrylate compound of formula (8) and a (meth)acrylate compound of formula (11) is taught (columns 6 and 7). Stryrenic end groups are not mentioned.

WO '781 discloses functionalized polyphenylene ether resins having at least one end cap that is a carbon-carbon double bond that is further reacted with styrene or acrylonitrile to produce a copolymer thereof. The capping agents disclosed include styrene, substituted styrene, acrylonitrile and (meth)acrylates on page 10 [0025]. The formula of the functionalized PPE polymer is given by formula (VII) on page 11 [0028]. The difference from the instantly claimed polyphenylene ether is that WO '781 does not disclose units corresponding to –O-X-O- in the instant claims.

It would have been obvious to one skilled in the art at the time of the invention to substitute styrenic end groups, as taught by WO '781 in an analogous polyphenylene ether oligomer, for the ethylenically unsaturated (meth)acrylate end groups in the functionalized derivatives of polyphenylene ether oligomers disclosed by Amagai et al. Amagai et al provide motivation by teaching that the (meth)acrylate groups allow the polyphenylene ether to be polymerized with a different unsaturated compound (column 28, lines 43-55). WO '781 provides motivation by teaching that styrene as well as (meth)acrylate can be reacted with a polyphenylene ether to provide ethylenic unsaturation for copolymerization with other monomers, polymers or copolymers (page 12, [0033] and [0034].

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al (6,835,785) in combination with WO 03/020781. Ishii et al discloses a bifunctional phenylene ether oligomer and its derivatives, wherein the oligomer comprises structural units corresponding to structural units (2) and (4) in the instantly claimed vinyl compound. A thermosetting resin comprising epoxy or vinyl end groups of

formula (1) is taught (column 3, line 62, to column 4, line 43). An epoxy acrylate compound of formula (16) and a (meth)acrylate compound of formula (10) is taught (columns 5 and 6). Stryrenic end groups are not mentioned.

WO '781 discloses functionalized polyphenylene ether resins having at least one end cap that is a carbon-carbon double bond that is further reacted with styrene or acrylonitrile to produce a copolymer thereof. The capping agents disclosed include styrene, substituted styrene, acrylonitrile and (meth)acrylates on page 10 [0025]. The formula of the functionalized PPE polymer is given by formula (VII) on page 11 [0028]. The difference from the instantly claimed polyphenylene ether is that WO '781 does not disclose units corresponding to –O-X-O- in the instant claims.

It would have been obvious to one skilled in the art at the time of the invention to substitute styrenic end groups, as taught by WO '781 in an analogous polyphenylene ether oligomer, for the ethylenically unsaturated (meth)acrylate end groups in the functionalized derivatives of polyphenylene ether oligomers disclosed by Ishii et al. Ishii et al provide motivation by teaching that the (meth)acrylate groups allow the polyphenylene ether to be polymerized with a different unsaturated compound (column 28, lines 43-55). WO '781 provides motivation by teaching that styrene as well as (meth)acrylate can be reacted with a polyphenylene ether to provide ethylenic unsaturation for copolymerization with other monomers, polymers or copolymers (page 12, [0033] and [0034].

The applied references to Amagai et al and Ishii et al have a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, each constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not

claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-9 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 of U.S. Patent No. 6,835,785 in view of WO '781. Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons. Claims 1-2 of US '785 set forth a polyphenylene ether corresponding to the polyphenylene ether in the instant claims except that the end groups are $-CH_2CH=CH_2$ instead of styrenic. WO '781 discloses analogous polypheylene ethers of formula (VII) having end groups of formula (II) wherein R^1 can be

aliphatic (such as $-CH_2-$) , cyclic or aromatic (such as benzyl). It would have been obvious to one skilled in the art at the time of the invention to substitute an aromatic vinyl end group, such as styrene, as taught by WO '781 for the vinyl end groups in the polyphenylene ether claimed in US '785 because WO '781 teaches that either vinyl group is a suitable capping agent for an analogous polyphenylene ether. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of successfully providing a vinyl end capped polyphenylene ether copolymerizable with other monomers, as taught by WO '781.

Claims 1-9 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,794,481 in view of WO '781. Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons. Claims 1-6 of US '481 set forth a polyphenylene ether corresponding to the polyphenylene ether in the instant claims except that the end groups are –OH instead of styrenic. WO '781 discloses analogous polypheylene ether oligomers that are reacted with an end-capping agent to provide a polypheylene ether of formula (VII) having end groups of formula (II) wherein R^1 can be aliphatic (such as $-CH_2-$) , cyclic or aromatic (such as benzyl). It would have been obvious to one skilled in the art at the time of the invention to react the bifunctional polyphenylene ether in the claims of US '481 with an aromatic vinyl end capping agent, such as styrene, as taught by WO '781, to provide a polyphenylene ether having copolymerizable end groups because WO '781 teaches that a styrene group is a suitable capping agent for an analogous polyphenylene ether. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of successfully providing a vinyl end capped polyphenylene ether copolymerizable with other monomers, as taught by WO '781.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

EP 0 542 232 discloses a polyphenylene ether having styrenic end groups.

Yeager et al (6,352,782) disclose carbon-carbon double bond end-capped polyphenylene ether resins of formula $Q-(J-K)_y$ defined in columns 6-7 wherein the end cap is (meth)acrylate or allyl. Yeager et al do not disclose units corresponding to –O-X-O- in the instant claims or styrene end caps. Styrene monomers are taught as polymerizable monomers in compositions comprising the PPE resins.

JP patent no 406087970 A discloses a polyphenylene ether prepared from 2,6-xylenol and incorporated with 10 wt % styrene. It is not known from the Abstract whether the "incorporated" styrene is mixed with the polyphenylene ether or reacted with the polyphenylene ether.

Ishii et al, in US 2004/0132941 or Application S. N. 10/626,575, disclose and claim a polyfunctional (meth)acrylate compound obtained by end-capping a polyphenylene ether corresponding to the polyphenylene ether backbone of the instantly claimed polyphenylene ether.

Ishii et al (6,689,920) disclose a process for producing a bifunctional phenylene ether corresponding to the bifunctional phenylene ether employed to provide a styrene end-capped polyphenylene ether in the instant application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan W Berman whose telephone number is 571 272 1067. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272 1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Susan W Berman
Primary Examiner
Art Unit 1711

SB
February 22, 2005